

Claims

- [c1] 1.A while drilling system for determining downhole parameters, the system positioned in a downhole drilling tool suspended in a wellbore, the system comprising: a retrievable while drilling tool positionable in the downhole drilling tool, the while drilling tool having a first communication coupler at an end thereof; a sensor chassis supported in the drilling tool, the sensor chassis having a second communication coupler at an end thereof for operative connection with the first communication coupler; and at least one sensor positioned in the chassis, the at least one sensor adapted to measure one of internal parameters of the drilling tool, external parameters in the wellbore and combinations thereof, the sensor operatively connected to the while drilling tool via the communication coupler for communication therebetween.
- [c2] 2.The while drilling system of claim 1 further comprising at least one sleeve adapted to support the chassis within the drill collar.
- [c3] 3.The while drilling system of claim 2 wherein the at least one sleeve is a loading device.

- [c4] 4.The while drilling system of claim 1 further comprising an end cap removably insertable into an end of the chassis.
- [c5] 5.The while drilling system of claim 1 wherein the couplers are induction couplers.
- [c6] 6.The while drilling system of claim 1 wherein the chassis is positioned within the drill collar such that a mud flows between an outer surface of the chassis and the drill collar.
- [c7] 7.The while drilling system of claim 1 wherein the chassis is positioned within the drill collar such that a mud flows through a passage in the chassis.
- [c8] 8.The while drilling system of claim 7 further comprising at least one flow diverter at an end of the chassis.
- [c9] 9.The while drilling system of claim 7 wherein the second coupler is a flow diverter.
- [c10] 10.The while drilling system of claim 1 wherein the at least one sensor measures one of gamma ray, shock, vibration, pressure, temperature, sonic speed, arrival time and combinations thereof.
- [c11] 11.The while drilling system of claim 1 wherein the at

least one sensor comprises one of an internal pressure sensor, an external pressure sensor and combinations thereof.

- [c12] 12. The while drilling system of claim 11 wherein the chassis has an internal orifice extending from the internal pressure sensor to a passage extending through the drill collar.
- [c13] 13. The while drilling system of claim 11 wherein the chassis has an external orifice extending from the external pressure sensor to the wellbore.
- [c14] 14. The while drilling system of claim 1 further comprising telemetry for communicating with a surface unit.
- [c15] 15. A while drilling system for determining downhole parameters, the system positioned in a downhole drilling tool suspended in a wellbore, the system comprising:
 - a retrievable while drilling tool positionable in the downhole drilling tool, the while drilling tool having at least one sensor therein;
 - a landing collar positioned in a drill collar of the downhole drilling tool, the landing collar having a pocket adapted to receive the while drilling tool, the landing collar having an orifice therethrough in fluid communication with the wellbore via an aperture through the

downhole drilling tool;

a flow restrictor positioned in the pocket, the flow restrictor adapted to selectively permit the flow of fluid into the pocket via the orifice.

[c16] 16.The while drilling system of claim 15 wherein the flow restrictor is one of a choke, a valve, and combinations thereof.

[c17] 17.The while drilling system of claim 15 wherein the sensor is adapted to measure one of gamma ray, shock, vibration, pressure, temperature, sonic speed, arrival time and combinations thereof.

[c18] 18.The while drilling system of claim 15 wherein the while drilling tool is selectively reseatable in the pocket.

[c19] 19.The while drilling system of claim 15 wherein loading device is integral with the drill collar.

[c20] 20.The while drilling system of claim 15 wherein the loading device is positioned in the drill collar with seals therebetween.

[c21] 21.A method of measuring downhole parameters while drilling, comprising:
advancing a downhole drilling tool into the earth to form a wellbore, the downhole drilling tool having a chassis

therein with at least one sensor therein;
seating a while drilling tool in the downhole drilling tool;
operatively connecting the while drilling tool to the chassis for wireless communication between the sensors and the while drilling tool; and
sensing wellbore parameters via the at least one sensor.

[c22] 22.The method of claim 21 further comprising selectively retrieving the while drilling tool from the downhole drilling tool.

[c23] 23.The method of claim 21 further comprising passing signals between the while drilling tool and a surface unit.

[c24] 24.The method of claim 21 further comprising selectively exposing the at least one sensor to one of an internal pressure of the drilling tool, an external pressure about the drilling tool and combinations thereof.

[c25] 25.The method of claim 21 further comprising selectively positioning the chassis within the drilling tool via a loading device.

[c26] 26.A method of measuring downhole parameters while drilling, comprising:
advancing a downhole drilling tool into the earth to form a wellbore, the downhole drilling tool having a landing collar therein;

seating a while drilling tool in a pocket in the landing collar, the while drilling tool having at least one sensor therein;

selectively establishing fluid communication between the pocket and the wellbore via an orifice in one of the downhole tool, the landing collar and combinations thereof; and

sensing wellbore parameters in the pocket via the at least one sensor.

[c27] 27. The method of claim 26 further comprising positioning a valve in the pocket to selectively permit fluid to pass through the orifice.

[c28] The method of claim 26 further comprising selectively retrieving the while drilling tool from the downhole drilling tool.